Fast Extraction to R-line

Objectives:

1) Determine if beam can be extracted at d6 by using the kicker at F3.
2) If successful, try to quantify the extraction efficiency.

Instrumentation:

1) PUEs at D1, C3, C5, B6
2) WCM at E6
3) Booster Current transformers
4) Loss monitors
5) BoosterOrbitDisplay
6) D6 flag

Setup:

1) Ideally, start with a machine that is already running SEB to R line. That way the R line magnet settings, D3 and D6 are setup to bring beam down R line.
2) Adjust synch.st and Cogging Arm delay (Booster/Rf/BtaCogSync_Trigs) to get the kicker to fire on flattop. This should not be difficult since Cogging Arm is real time. Although there may be some maximum delay…
3) Synchro should be off. This requires Synchst on and synch_loop.st off. No COG event on Supercycle.
4) Set H tune to near 4.67. Resonance may be a problem here.
5) Set SEB bumps to make bump at D3 to outside with tune of 4.67. Otherwise, use nominal extraction bump. In either case, may want to check/adjust SEB bump to reduce residuals. Hopefully, OrbitDisplay will help with reduce residuals. A2 and A8 pues would also help, but presently these don't work in MCR. Ideally the bump should produce no loss when beam is not kicked, though it may prove necessary to increase the amplitude to achieve optimal (or any) extraction.

How does one determine that beam has been extracted at D6?

1) Check for beam on hardwired PUEs (C4, D1, B2). See how much beam is left on WCM (at B6?).
    a. Ideally, want to see same intensity with and without kick on C4 and D1, with no beam on B2 after kick. Beam on WCM should also disappear after kick. Adjust bump magnets and kick (amplitude, timing) to accomplish this.
    b. Can transport to D1 be quantified using D1 PUE with and without kick? Are there saturation issues?
2) Look for beam in R line. D6 flag, ion chamber at 63 feet.
3) When (if) beam is observed there, adjust parameters to maximize (tune, bump magnets, D3, D6, radius, kicker timing and amplitude…) beam on swic at 63 ft. This may be difficult since its response to bunched beam is not well-known. If losses are visible, look on loss monitors for transmission from F3 to D6 as well.

Data:

1) SWIC profiles and scalers (at least 063), D6 flag picture of extracted beam, if any.
2) Scan booster intensity and get 063 scaler data at different intensities.
3) If relevant, measure PUE sum at D1 with and without kicking.
4) Scope dumps of relevant loss monitors.
5) Scope dumps of WCM and PUEs at time of kick.
6) Archive extraction setup
7) Booster orbit with extraction bump.